# THE INCLUSION OF PSEUDOWORDS WITHIN THE YEAR ONE PHONICS 'SCREENING CHECK' IN ENGLISH PRIMARY SCHOOLS

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**Abstract**

The paper highlights problems surrounding the Year 1 Phonics Screening Check that has accompanied the legislative framework for synthetic phonics in English primary schools. It investigates the inclusion of pseudowords and raises questions regarding their generation and categorization, the rationale for their inclusion and the assumption that the early ability to read pseudowords is associated with later success in reading. It draws upon evidence from comparative European orthographic studies employing pseudowords that have implications for the way English pupils learn to read.

**Key words**
pseudowords, reading assessment, phonics 'Check', English orthography.

## 1. INTRODUCTION

The 'war' about whether phonics should be taught in primary classrooms shifted during the 1990s to a general acceptance of it being part of a 'mixed approach' to teaching reading (Goswami, et al.,1998, p.20). Since then there has been a return to former battle lines with frequent skirmishes between advocates of different approaches. On one side have been the front-line synthetic protagonists who reason that pupils learn to read from left to right by decoding letters and blending them into sounds. Many are campaigners allied with the UK Reading Reform Foundation (RRF), a pressure group set up by Mona McNee in 1989 to establish synthetic phonics as the key to early reading success (RRF, 2004). Since then McNee has been tireless in exhorting teachers to adopt such an approach, arguing that that there was a correlation between the arrival of new methods in England, like 'look-and-say', and an upsurge in levels of criminality:

> If we'd had the proper teaching of reading since 1945…England would be a *wonderful* place… We'd have one bobby at a football match and people could walk in the streets without being mugged, because the people who were mugging them would have a job because they could read… It all interlocks. (McNee, 1990)

The slippage from phonic methods of English teaching to standards in English, and then interlocking this discourse to a quite distinct one regarding the moral standards of *the* English, carries with it an agenda that goes beyond education. Recently, in an address to British National Party, she spoke passionately of the 'big problems' England now faces (from the threat of immigration to the continuing decline in reading standards) and of her solution to the problem – 'I start with c-a-t' (McNee,

2012, 2000). For McNee the absence of systematic synthetic phonics until recently amounted to 'cruel, academic child abuse' (McNee, 1993).

On the other side are adversaries who view the recent statutory imposition of synthetic phonics as - and here Davis is only marginally more reserved than McNee - '*almost* a form of abuse' (Davis, 2012, our emphasis). The 2006 Rose Review, formed to advise the government of the time, was criticised for its lack of even-handedness in its coverage of research evidence and for its key recommendation that synthetic phonics should be taught 'first and fast' (see Lewis & Ellis, 2006; Goouch & Lambirth, 2007; Davies, 2013). Some concluded that the Review provided 'no reliable empirical evidence that synthetic phonics offers the vast majority of beginners the best route to becoming skilled readers' (Wyse and Gowswami 2008, p.691, 701) or that it was simply 'wrong' (Wyse & Styles, 2007, p.41). Others were more scathing, with Hynds declaring that it was 'a cunningly worded, politically motivated, dogmatic and dictatorial document' (Hynds, 2007. p.271) and Davis arguing that it was part of 'a monstrous regimen' (Davis, 2012). Wray was left pondering:

> What is going on here?... Government ministers, and Rose himself, try to dress the report's recommendations as based on a consensus derived from research. This is actually nonsense... What has actually happened is that pressure groups with axes to grind (and, usually, teaching programmes to sell) have caught the ear of politicians and the Rose Review was never going to be a balanced interpretation of the evidence. (Wray, 2006, p.127-8)

Earlier in 1990s Wray favoured *Balance*, a pressure group that sought 'to provide a rallying point in the middle ground for those who support a balanced attitude to the teaching of reading and language' (Balance Manifesto, 1991). Because no one would wish themselves to be considered unbalanced, for balance brings connotations of moderation and reflection and infers a stance of consideration, stability and neutrality, it is today a term employed frequently by battle-scarred adversaries with distinct views, as well as ideologues of the centre about how children should be taught to read.

This paper does not return to the battleground or to current legislation that now stipulates a particular method of teaching reading in English primary schools. Nor does it question the consequences this may have upon the nature of professionalism and the reduction of teachers to instruments of government policy where curriculum and aspects of pedagogy are now stipulated (see Alexander, 2004; Gibson & Patrick, 2008). Rather, it focuses on problems surrounding the *Year 1 Phonics Screening Check* that accompanies the legislative framework for synthetic phonics. The paper investigates, specifically, the inclusion of non- or pseudowords in the Check and raises questions regarding their generation and categorisation; the rationale for their inclusion; the assumption that 'the early ability to read pseudowords is strongly associated with later success in reading' (Lloyd-Jones, 2012); and draws upon evidence from comparative European orthographic studies employing pseudowords that have implications for the way English pupils learn to read.

## 2. TEACHERS' INITIAL CONCERNS WITH THE CHECK

The Department for Education (DfE) describes the Check thus:

> The *Phonics Screening Check* is a short, light-touch assessment to confirm whether individual children have learnt phonic decoding to an appropriate

standard. It will identify the children who need extra help so they are given support by their school to improve their reading skills. They will then be able to retake the check so that schools can track children until they are able to decode. (DfE, 2013a)

In England all eligible Year 1 pupils now take the Check in June and retake it in Year 2 if they fail. They are presented with 40 words divided into two sections of 20 real words and 20 'pseudowords'. The outcomes are reported to Local Authorities and to parents and made available for OFSTED to scrutinise during school inspections. Formal rules for administering the test are contained in the 'Check administrators' guide' (S&TA, 2014) that suggests that it must administered by a qualified teacher, that each test takes approximately 4-9 minutes and that display material in the room, that could prompt a child towards a correct answer, should be removed or covered.

Soon after the Check first ran in June 2012 professional bodies associated with literacy teaching, like UKLA (United Kingdom Literacy Association) and NATE (National Association of Teachers of English), asked members to report their experiences and express their judgements. Clark was pivotal in voicing worries emerging from the profession with frequent updates and reflections in *Education Journal*. One concern that materialised was the 2012 'results spike' in which the pass mark, set at 32 and known beforehand by teachers, led to 1 percent of children scoring 31 and 7 percent scoring 32 (Clark, Oct 2013b, p.14). The assumption made by the DfE was that pupils on the borderline may have been 'marked up' (see Townley & Gotts, 2013) so that, by June 2014, the pass mark was released only after the Check was completed (S&TA, 2014, p.4). Another worry was the idea of communicating failure to young children and their parents, with the potentially damaging effects this would have upon the child's self-esteem and home-school relationships (see UKLA, 2012, p.5-6). Some teachers reported that the test was un-diagnostic (see Clark, Oct 2013d, p.15) and revealed no novel assessment information: '91% of respondents felt the Check did not tell them anything they did not already know about the children's reading ability' (ATL, NAHT, NUT, July 2012. See also Duff et al., 2014; NFER, 2014). Many reported that it did not address the particular needs of pupils with ESL, to which the DfE reported that in the first year 'the same percentage as those whose first language was recorded as other than English passed the test' (DfE, 2013b, p.2). The budget for the Check was subject to close scrutiny by Clark who was assiduous in her demand for such information, at one point invoking the Freedom of Information Act to obtain it. She discovered significant costs associated with the initial pilot project (£3 million), the provision of supply teachers to schools to substitute for those administering the Check (see also NFER, 2014, p.9), the publication and distribution of guidance support and test materials, the availability of £3,000 'matched-funding' per school to purchase government approved commercial phonics materials that alone came to £22 million over the first two years, and so on (Clark, Jan 2014, p.13. See current reported costs in NFER, 2014). The number of pupils failing the Check was also a concern. In 2012, 58 percent of pupils had passed and this had risen only to 69 percent in 2013. Moreover, Clark found 'wide variation in the percentages passing within different groups of children (62% of girls scored 32 or more but only 54% of boys) and only 44% of those on free meals met this 'required standard'' (Clark, 2013b, p.14).

More importantly for this paper, many teachers thought that the Check misidentified pupils who came to school already seeing themselves as readers  and who were beyond the stage of phonetic decoding: 'In several cases successful, fluent readers did

less well in the Check than emergent readers… Most schools surveyed indicated that the phonics Check seriously disadvantaged, and in some case impeded, successful readers' (UKLA, 2012, p.3. See also Lewis and Ellis, 2006, p.15). The general view was that some above average readers (i.e. those achieving 2c and above in Year 2 SATS tests) looked for and substituted real or semantically meaningful words for pseudowords, e.g. 'shame' for *shan* (2012) and 'farm' for *flarm* (UKLA, 2010). This led UKLA to conclude: 'Schools overwhelmingly stated that they felt that there were far too many nonsense words, and that these confused more fluent readers, who had been taught to read for meaning' (UKLA, 2012). Clark reinforced the point: 'There is evidence from the online surveys by UKLA and the teachers' unions that some of those confused by the pseudowords were children who were already reading. There is also evidence of a great deal of time being devoted to pseudowords in preparation for the test. What message does this give to young children about reading?' (Clark, April 2013a, p.7). Furthermore, she maintained, 'no clear explanation has been given for the inclusion of pseudowords in the test' (Clark, Oct 2013b, p.15). In what follows we develop some of these concerns about the use of pseudowords in the Check.

## 3. PSEUDOWORDS IN THE CHECK

Pseudo, non, wug, nonsense or alien words all describe the same phenomenon. Here we adopt DfE usage and use the term pseudo. Today pseudowords are commonly produced by algorithmic software programmes, like *Wuggy*, that generate exemplars said to avoid defects emerging from more labour-intensive methods that can have 'a strong impact on lexical decision performance' (Keuleers & Brysbaert, 2010, p. 627). Pseudowords can be variously categorised. Pseudohomophones are pronounceable nonwords that sound like real words (e.g. *brane, phrog, beddrune, durt*) and thus normally avoided in reading tests for their potential to elicit unintended meanings insofar as they generate 'noticeable differences between pseudowords and pseudohomophones in recognition memory experiments' (Ozubko & Joordens, 2011, p.124). Pseudowords can also be formed from 'illegal' letter strings (e.g. *ldfa* and *zsfaish* in English, *chenfe* in French, and *saf* in Spanish – see Keuleers & Brysbaert, 2010, p. 627) that have neither orthographic nor phonographic rime neighbours (see Goswami et al. 1998, p.22). There are also pseudowords formed from 'legal' letter strings (e.g. *dilt* or *dake* in English, *fanche* in French and *nas* in Spanish) that have analogous real word neighbours (viz. 'cake', 'manche' and 'gas') and so can be read by using rime units from neighbouring real words or by assembling grapho-phonemic correspondences (GPC) (ibid, p.22). There is also a subcategory of legal pseudowords that have no orthographic rime neighbours (e.g. *daik*) and that rely solely upon the reader assembling GPCs (ibid, p.22). In the absence of any explicit rationale for the choice of pseudowords in the Check we assume that DfE lists: (a) would not include pseudohomophones; (b) include only legal letter strings that conform with the orthographic and phonological patterns of English; (c) are therefore readily pronounceable in English; (d) choose to exclude letter sequences that could be legitimately blended to produce several permissible sounds; and (e) are not 'real' or meaningful in any way. In what follows we draw upon a DfE training brief, *Year 1 phonics screening check video* (DfE, 2012), published to support teachers administering the test, and our examples of pseudowords come solely from this source.

The first concern is the inclusion of rare or anachronistic real words mistakenly classified as pseudo. In urban slang *splok* means 'the physical impairment in which

one is unable to smell, similar to deaf or numb' as in 'After the brain damage Barry was *splok*' (Urban Dictionary, 2014). *Scrope* is also a real word. An accomplished Year 1 historian may know that Richard le Scrope (1350-1405) was the Bishop of Lichfield and Archbishop of York and executed for his participation in the Northern Rising against King Henry IV. There are other such examples. Apart from drawing attention to a problem of classification, the inclusion of such words is possibly of little consequence and easily remedied by redefining pseudowords to include pronounceable anachronisms or rare items (see Ozubko & Joordens, 2011).

A second more serious concern involves the nature of phoneme-grapheme ambiguity and the seeming unawareness of permissible alternatives in sounding out pseudowords. It is reminiscent of Smith's observation that grapheme-phoneme correspondences are often more concealed than first acknowledged:

> How are the letters *ho* pronounced? Not in a trick situation, as in the middle of a word like shop, but when *ho* are the first two letters of a word? Here are eleven common words in each of which initial *ho* has a different pronunciation – *hot, hope, hook, hoot, house, hoist, horse, horizon, honey, hour, honest*. Can anyone really believe that a child could learn to identify these words by sounding out the letters? (Smith, 1985, p.54-5).

The pseudoword *jound* in the training materials could be made to rhyme with the real words 'round' or with (a bleeding) 'wound'. The video commentator, exemplifying how the marking criteria should be applied, assesses the first to be correct but leaves the alternative unaccounted for. Similarly, upon one child's pronunciation of the pseudowords *emp* the commentator remarks: 'There is a pause between each letter being sounded out and therefore the non-word has not been blended sufficiently'. What goes unacknowledged is that the reason for this may be the complexity that syllabic structures and morphemic boundaries have upon alternative pronunciations, as in the analogous real word 'emphasis'. (We later comment on the effect pseudowords may have upon short term memory, on the need to 'pause', and the influence this may have upon a child's speed and accuracy of response). Other words in the Check, where legitimate alternative pronunciations of pseudowords go unheeded or are discounted, follow a similar pattern.

The target pronunciation for the pseudoword *roopt* is said to be <ru:pt>. One may ask, however, if <rʊpt> is an alternative, although unmentioned in advice to teachers. Above we suggested that the government's adoption of synthetic phonics as the only legitimate approach to early reading is based upon the notion that English orthography operates principally through the orderly sequential representation of strings of discrete phonemes by strings of discrete graphemes. Thus word recognition must always proceed from left to right as the reader processes each grapheme in turn, using it to identify the appropriate phoneme. One assumes that all the governmentally acceptable pronunciations of the pseudowords in the Check can be derived by operating in this way. However, critics of left-to-rightism, like Smith above, point to the way English orthography frequently requires the reader to take account of the letter or letters that follow, especially where vowels are concerned. In essence, the pronunciation of vowels in words often depend on what vowels or consonants come later so that left-to-rightism is said to distort by simplification the way English orthography frequently works. (In section 5 below we develop this argument further and compare the use of pseudowords in English with other orthographies). Employing the Check's own logic and its questionable portrayal of English orthography, one could argue that left-to-rightism opens up a new array of

equally valid options that go unrecognised. Thus, in the case of the pseudoword *roopt*, a real analogous word like 'rook' makes <rʊpt> also a valid choice. We believe other pseudowords have these possibilities.

For example, the target or 'correct' answer for the pseudoword *sheb* is <ʃeb>.  An alternative legitimate pronunciation, however, could be <ʃi:>  if the final consonant 'b' was deemed silent as in the analogous real word 'lamb'. Similarly, by applying the questionable principle of left-to-rightism and decommissioning the orthographic principle of taking account of how future letters may affect the pronunciation of a vowel, *she(b)* could legitimately be read as <ʃi:b>) (as in 'sheep'), <ʃeɪb> (as in 'sheik') or <ʃɜ:b> (as in 'sherbet'). To be clear, we are not arguing that these are realistic or permissible pronunciations if the complex rules underpinning English orthography were fully employed, but we are suggesting that when left-to-rightism is privileged and pseudowords introduced (where context and meaning are intentionally omitted) such options are perfectly feasible. Again, glossing the observation that the pseudoword *yed* is a real if archaic Middle English noun meaning 'a song, poem, speech, tale, riddle', the target pronunciation from the training video must evidently rhyme with 'dead' (<jed>). Leaving aside the complication of real words that have this letter string in their final position (and rhyme with 'made' <eɪd> as in 'portrayed', 'obeyed', 'decayed', 'conveyed' or 'played') there is no guidance for teachers interpreting other analogous possibilities where *ye(d)* appears at the beginning of a word and left-to-rightism employed, as in 'year' (thus <ji:d>), 'yearn' (thus <jɜ:d>), 'yea' (thus <jeɪd>) or  'yeah' (<jɛəd>). We are suggesting that the training material not only tacitly forecloses upon and censures possible phonological options by overlooking or choosing not to omit them, but is rather less permissive than many academic studies testing pupils' response to pseudowords that advocate 'lenient' interpretations. For example, Frith et al. state explicitly that responses to pseudowords ('nonwords') in their study were scored so as to give credit to any admissible pronunciation of phonemes:

> In scoring the reading of the English nonwords, lenient criteria were used, so that all legally possible grapheme-phoneme relations (including context-inappropriate relations) were accepted as correct re-codings. For example, in the case of *theart*, four different readings, varying in pronunciation of the vowel grapheme, were all scored as correct: Eight children pronounced the ea as in *heard*, 4 as in *heart*, 2 as in *hear*, and 2 as in *bear*. Differences in vowel length, including the silent-e rule, were disregarded. For example, in reading *saker* (intended analogy = baker), 9 children shortened the vowel to *sacker*, whereas, in the reading of *blan*, the vowel was occasionally lengthened to *blane* (3 children). In contrast to nonwords, words were scored strictly.
> (Frith, et al.,1998, p.36)

Such detailed and subtle advice is absent from the training material.

The third concern is the unacknowledged complexity of pupils' accents. DfE's advice is that '5' (DfE, 2014). The position would appear to deny the possibility of a teacher's preference for Received Pronunciation and conforms to common research practice: 'In scoring nonsense word accuracy, any pronunciation that was plausible according to grapheme-phoneme rules was accepted as correct' (Goswami, et al. 1998, p.27). Government guidance is clear:

> Alternative pronunciations must be considered when deciding whether a response is correct. For real words, inappropriate grapheme-phoneme correspondences must be marked incorrect (for example, reading 'blow' to

rhyme with 'cow' would be incorrect). However, alternative pronunciations of graphemes will be allowed in pseudo-words. (Standards & Testing Agency, 2014).

Leaving aside the reason for the degree of latitude given to the pronunciation of pseudo but not real words, our concern is what 'taken into account' or 'must be considered' might mean. Relatively unproblematic examples like 'path' (<pɑːθ> or <pæθ>) and 'bath' (<bɑːθ> or <bæθ>) are shown on the video to demonstrate how two children from the north and south of England are permitted to voice the grapheme 'a' in different ways  (see British Library, 2015). However, the video commentary also suggests: 'Children can use any acceptable regional pronunciation *even if it's not within their usual accent*' (DfE, 2012, our emphasis). Guidance presents, therefore, a conundrum. On the one hand a teacher will need to make a judgement about whether the child's offering of a pseudoword is 'a plausible pronunciation' while, on the other, consider whether it is acceptable *even if* it is not uttered in their usual accent. Put simply, would an English pupil reading a pseudoword be permitted to adopt an Australian accent, or even adopt one unknowingly? One might question if teachers are equipped to assess whether a child is intentionally or accidentally deviating from their customary accent, or even if this consideration is relevant given the degree of permissiveness within the advice concerning the pronunciation of pseudowords?

The point can be illustrated by linking points two and three above, concerning the issues of alternative grapheme-phoneme correspondences and permissible pronunciation. On the training video *vead* is a pseudoword five children attempt and their answers deemed to be correct or incorrect:

> <viːd> (sounds like 'seed')  √ child 1&3
> <ved>  (sounds like 'bed')  √ child 2
> <væd> (sounds like 'mad') X child 4
> <veɪd> (sounds like 'made') X child 5

Following our argument above about the problem of left-to-rightism, other possible interpretations of *vead* based upon graphophonemic correspondences for the 'ea' vowel diagraph would include:

> <yɜːd>(as in heard)
> <bɪəd> (as in beard)
> <vɑːd> (as in heart)
> <veɪd> (as in dead? ... see below)

From the training video <viːd> and <ved> appear as the sole alternative target pronunciations. While we would concur that there are illegitimate pronunciations (as in child 4's attempt) we would argue that there are perfectly feasible alternatives to the stipulated 'correct' answers. Moreover, child 5's 'incorrect' attempt, where they pronounce *vead* to sound like 'made' (<veɪd>), is deemed an impermissible pronunciation and marked wrong. However, it illustrates the confusion in the assessment criteria for, by mimicking a Texan accent, it could be argued that *vead* can rhyme with 'made', as in 'over my <deɪd> body' (see Texasalmanac, 2014). The problem arises not only because of the nature of accents, a curious twist in the degree of leniency regarding pronunciation in the Check, the potential for the non-recognition or wrong interpretation of a pupil's accent and the underlying complexity of the nature of allophones. Future research might profitably focus upon pupils with ESL taking the Check, where teachers' knowledge of the multitude of various accents may be stretched. (And, at the risk of belabouring the point about the classification of

pseudowords, *vead* is actually a rare but real word, but this time one that some children might actually know ... a Codemon wiki).

## 4. PSEUDOWORDS AS PREDICTORS OF CHILDREN'S READING SKILLS

We read above of Clark's concern that 'no clear explanation has been given for the inclusion of pseudowords in the test' (Clark, 2013b, p.15). A rationale, however, can be gleaned from research literature. Siegel has argued:

> In an alphabetic language such as English, the best measure of phonological processing skill is the reading of pseudowords; that is, pronounceable combinations of letters that can be read by the application of grapheme-phoneme conversion rules, but they are, by definition, not real words in English... Pseudowords can be read by application of grapheme-phoneme conversion rules even though the words are not real and have not been encountered in print or in spoken language. (Siegal, 1998).

Her argument is that 'the ability to decode pseudowords indicates to what extent a child has mastered alphabetic mapping, a skill considered critically important for learning to read' (Tal & Siegel, 1996, p.224). Although pseudowords may be thought to be read in part by analogy to real words, Siegel argues that grapheme-phoneme conversion rules and segmentation skills are still required to read them correctly: 'For example, for a correct reading of the pseudoword *dake*, it must be segmented into an initial letter *d* and a rime or word body *ake*; the latter could be read by analogy to *cake*, but the sound of *d* and the segmentation itself are, in fact, phonological processing skills' (Siegel, 1998; see also Tal & Sigel, 1996). Similarly, in an extensive review of literature on beginning reading, Stanovich notes that 'for adults as well as children, the speed of naming pronounceable nonwords words is one of the tasks that most clearly differentiates good from poor readers' (Stanovich, 2000, p.40) and of the 'incredible potency of pseudoword reading as a predictor of reading difficulties' (ibid. p.207, 100). More recently Lloyd-Jones has likewise argued: 'Research has shown that the early ability to read pseudo-words is strongly associated with later success in reading. *The reason for this is simple.* Children who can decode a wide range of pseudo-words are clearly demonstrating that they have cracked, or are well on the way to cracking, the phonic code' (Lloyd-Jones, 2012, our emphasis). For these commentators pseudowords should be included in the Check insofar as they help to provide a clear and unambiguous picture of children's reading development: 'If a child can decode one of these pseudo-words their success cannot be explained away as just a word they happened to recognise or remember' (Lloyd-Jones, 2012). It underpins the DfE rationale for the Check, that it 'will identify the children who need extra help so they are given support by their school to improve their reading skills' (DfE, 2013a).

We offer two responses. The first is that there is a body of research literature to suggest that real rather than pseudoword reading may be *at least* if not *more* accurate in predicting future reading fluency. Fuchs et al., for example, employed word identification and pseudowords fluency tests with Y1 pupils and concluded that the research 'demonstrated the superiority of word identification fluency over nonsense word fluency' (p.7):

> In sum, results suggest that word identification fluency functions better than nonsense word fluency as a curriculum based measurement tool for assessing early reading development in first grade. Because predictive validity with respect to end-of-year text-reading fluency and comprehension is stronger for

> word identification fluency than for nonsense word fluency, word
> identification fluency provides a stronger basis for formulating screening
> decisions in October of first grade. (Fuchs et al. 2004. p.19. See also Seymour,
> et al., 2003)

They speculated why word identification was better than pseudoword fluency and suggested two possibilities. That low-performing students reading nonsense words 'were increasingly capable of saying many sounds very quickly, without achieving the alphabetic insight required for blending' (ibid. p.19); and that 'the restriction of the nonsense word fluency task to a single, easy phonetic pattern may reduce the correlation between nonsense word fluency and important criterion measures' (ibid, p.19. See also Clemens et al., 2011; Sisco-Taylor, 2012; Compton et.al., 2006). While other studies have indicated that *both* pseudo *and* real word identification fluency are good predictors of reading fluency (e.g. Sisco-Taylor, 2012, p.19; Duff, et al. 2014), the issue remains that the rationale for the inclusion of pseudowords in the Y1 phonics Check is not clearly explained, as Clark indicates, and is questionable insofar as it fails to justify what *additional* value (or, indeed, additional *harm*) the inclusion of pseudowords would bring to such an assessment.

The second response is to counter the assumption that grapheme-phoneme conversion is 'simple' (Lloyd- Jones, 2012). Embedded in the 'simple view of reading' is an assumption that reading is a decoding procedure that can be disconnected from more complex issues of semantics and processing activities that can be loosely associate with higher order reading skills and the search for meaning. Evidence for this comes from the 'pseudoword effect' and from neuroimaging and electrophysiology research. The pseudoword effect refers to a process in which participants are given a word recognition check and then re-tested with a new list containing items from the first that they are then required to identify. The effect refers to the interpretation of 'hits' (correct) and 'false alarms' (wrong recognition), and from this, it is claimed, 'researchers are able to make inferences about the memory system underlying such decisions' (Joordens et al., 2008, p.380). They find that pseudowords, as well as extremely low-frequency words because of their rarity (e.g. *waif*), give rise to considerably more hits and false alarms than real words. Some explain the phenomena in terms of overcompensation, in that pseudowords lack distinctive semantic meanings and are less memorable than words. However, others argue that there is 'strong evidence' to suggest that the effect is more the consequence of the very *absence* of 'distinctive semantics' associated with pseudowords:

> Distinctive semantics can help differentiate orthographically similar words
> (e.g., *horse* vs. *house*); thus, by lacking distinctive semantics, pseudowords
> are, on average, more similar to one another and less easy to differentiate than
> words (e.g., *glawk* vs. *grawk*). This increased inter-item similarity leads to
> enhanced subjective familiarity for pseudowords and, hence, boosts both hits
> and false alarms above those of words. (Ozubko & Joordens, 2011, p.125)

In essence, the idea that the decoding patterns involved in the reading of pseudowords is 'simple' at the level of brain activity lacks precision and is disputed. While a pseudoword like *sheb* may be not a pseudohomophone it may remind a young reader of a real word or bring some vague notion to mind. In so doing the 'pseudoword effect' indicates that semantic impoverishment may actually stimulate the brain more than real words *because* of its very impoverishment.

Brain research that locates pathways and processing areas associated with word and pseudowords recognition is a potentially valuable resource here, although complex, volatile and contested. In 1999 Hagoort et al. observed that 'positron emission tomography (PET) studies suggest that different brain areas are involved in different aspects of word reading... However, exactly which areas in the brain subserve which aspect of word processing is still a matter of debate' (Haggort et al., 1999). In 2003 Mechelli, et al. concluded that 'studies comparing words and pseudowords have produced inconsistent results' (Mechelli, et al. 2003. p.260). More recently Cibelli's review of current evidence started with the proviso that 'the nature of pseudowords processing pathways remains an open question' (Cibelli, 2012, p.113). Notwithstanding the provisional nature of this domain, one issue now generally agreed is that the human brain reacts differently to real and pseudowords and that the latter heightens activity (in the left inferior frontal cortex as well as the left superior temporal gyrus and bilaterally in the pre and postcentral gyri) in contrast to words with regular mappings of graphemes to phonemes: 'Greater brain activity associated with pseudowords illustrates that unfamiliar stimuli that are unable to access word associations may activate the neuronal network more strongly than familiar words for which access occurs with ease' (Price et al. 1996, p.62; Hagoort et al. 1999). Cibelli's explanation for this heightened reaction is that the brain starts '*an effortful search*' for representations in higher processing levels, but that because 'such a search ultimately fails, due to the unavailability of any representations matching their phonological content ... it nevertheless indicates that processing of pseudowords may not be restricted to auditory and phonological levels' (Cibelli, 2012, p.112, our emphasis). She provides evidence of a long latency of peak activation when reading pseudo (contra real) words and that this period of sustained heightened activity often persists well after the stimulus has been withdrawn. Thus, despite the novel structure of pseudowords that appear to have no reason to be processed by the brain as if they were higher-level activities (lexical, grammatical or semantic), the assumption that they can be considered an ideal control to contrast with real words, because they merely check phonological or 'simple' reading skills, would seem misleading. Moreover, such levels of heightened activity may be attributable not only to the problem of reading pseudowords but, more specifically, to reading *English* orthography in particular. Wyse and Goswami have speculated that 'human brains that learn to read English may in fact develop extra neural architecture that is not developed by brains learning to read more consistent alphabetic orthographies' (Wyse & Goswami, 2008, p.706).

## 5. PSEUDOWORDS, ORTHOGRAPHY AND TEACHING METHODS

That English orthography is distinct from many other European languages has been the object of unceasing sardonicism. The Bullock Report's suggested that *calmbost* could feasibly be pronounced as 'chemist', adding that for beginning readers 'the idea that at this level reading consists of matching sounds and symbols in some simple way is therefore quite untenable' (Bullock 1975, p.86-7). Dewey conceived that *phtheighchound* could be read as 'taken' - *phthi*sic, w*eigh*, s*ch*ool, glam*our*, ha*nds*ome - and Shaw's *ghoti* as 'fish'. (Note, however, that Shaw transgresses albeit complex rules that govern English orthography, viz. that gh can only be pronounced as 'fer' <f> at the end of morphemes, as in 'enough' and 'tough', and that in initial positions gh is always pronounced as 'ger' (<g>) as in 'ghost', 'ghetto' and 'aghast' – see Stubbs, 1980, p.51). The problem of consistency in symbol-to-sound mapping in English haunts synthetic phonics advocates like McNee who would 'start with c-a-t',

for a simple left to right approach to teaching reading ignores the complexities of orthographic transparency. The issue is well rehearsed, that its density means there are different pronunciations for the same spelling and identical pronunciations for different spellings. For the hundred most high frequency English words Dombey would suggest that '81% fail to meet the test of fully transparent spellings, where one letter consistently represents one phoneme' (Dombey, 2006, p.102). Put simply, if McNee were German, Italian, Welsh, Greek, Finnish or Serbo-Croatian, her argument might be more plausible.

Studies that compare English with languages that have shallower orthographies are numerous and well documented (e.g. Cossu, et al, 1995, Italian; Goswami, et al, 1997, Greek; Ellis & Hooper, 2001, Welsh). German, for example, is a relatively transparent language with close grapheme-phoneme correspondences and a higher consistency of vowels that make it easier to access syllables in contrast to English, and this effects the development of pupils' early reading skills: 'Low orthographic consistency, as in English, necessitates the use of complex and error-prone strategies in phonological recoding, whereas high consistency, as in German, allows phonological recoding into syllables on-line' (Frith et al., 1998, p.51. See also Seymour et al., 2003, p.143). Thus whereas German children become readers by relying 'heavily on word recognition via assembled pronunciation... the English children, in contrast, tended to move into reading by relying on direct word recognition' (Wimmer & Goswami, 1994, p.99). In other words, German children who learn connections between graphemes and phonemes become successful readers because spelling-sound correspondences are highly predictable.

This distinction is replicated in the responses of German and English children to pseudowords. Wimmer and Goswami found that 'the oldest group of English children made more errors in reading nonsense words than the youngest group of German children' (Wimmer & Goswami, 1993, p.100). Whereas German children showed 'a big advantage in reading the nonsense words', because they could apply simple grapheme-phoneme conversions, 'English children appear(ed) to rely more on some kind of direct recognition strategy' (ibid. p.91):

> The results of this study are very straightforward. The only difference, and it was a remarkable one, between the English and the German children was in the reading of nonsense words. A substantial number of English children at each age group had enormous difficulty in deriving acceptable pronunciations for these words, while for German children – even for the youngest ones – nonsense word reading posed little difficulty. (ibid. p.98-9)

Landerl reached similar conclusions, that 'in nonword reading tasks, the main indicator of children's phonological decoding abilities, English speaking first graders typically show high error rates between 40 and 80% ...while in many other orthographies like ... German the error rate (wa)s consistently below 25%' (Landerl, 2000, p.240).  Frith et al. similarly found, that by comparing 7-9 year olds reading real and pseudowords formed by exchanging onset and rime, pseudowords reading was significantly slower and more error-prone in English than in German:

> When reading nonwords, our sample of English-speaking 7-year-olds made errors in the region of 55%, compared to 15% errors made by their German-speaking age peers. In both language groups, performance improved substantially with age, but differences still persisted at age 9. Differences in nonword reading were far more striking than those in word reading, which were in fact no longer significant in 9-year-olds. This suggests a prolonged and

difficult period of acquisition for basic recoding skills over and above that of acquisition of word recognition skills. (Frith, et al., 1998, p. 39)

They found that even by the age of 12 'both groups had equally fast nonword-recognition latencies, but English-speaking readers were still less accurate when recoding long and complex nonwords' (ibid., p.31; see also Hagoort et al., 1999, p.384). Again, Seymour et al. demonstrated that 94.35% of German children succeeded with pseudowords compared with 29.26% of (Scottish) English, a group that fell 'far below the range for the other orthographies' (Seymour et al. 2003, p.157. See also Goswami et al., 1998, p.44,). In essence, there is a broad swathe of European research demonstrating that 'learners of transparent orthographies are better able to read nonwords' (Ellis et al, 2004, p.441).

This has implications for methods for teaching reading as well as for testing procedures in England. It is not disputed that German children are taught and learn phonics much faster than English children (see Wyse & Goswami, 2008, p.697). However, to attribute the slower rate of reading development in English pupils to historical shortcomings in teaching methods, and then legislate for testing in synthetic phonics to rectify this deficit, dismisses the findings of cross-cultural studies. While in shallow orthographies like German synthetic phonic methods are commonly used, in England the favoured approach was, until more recent times, 'mixed-methods' (and there is evidence to suggest that it *still* is in many teacher's minds - see NFER, 2014, p.8). For Seymour this historical difference in methods of teaching reading reflected not an obstinacy or political preferences for a teaching approach but the distinct orthographic structure of English: 'These methods are well adapted for deep orthographies in which commonly occurring words contain letter structures which are inconsistent with the principles of simple grapheme–phoneme correspondence' (Seymour et al. 2003, p.166. See also Wimmer & Goswami, 1994, p.99). The phonics Check is a correlate of the government-prescribed method. If testing has to be done, and there is little space here to address the underlying issue of how, when and why pupils' early reading achievements should be tested, then cross-cultural evidence of the marked difference in English children's response to pseudowords makes their inclusion questionable. While linguists may deploy pseudowords to assess the different responses of children across languages, this is a *quite* distinct purpose from the underdeveloped and dubious rationale for their inclusion in the Check. Paradoxically, the high failure rate in the first two years of the Check (42 percent in 2012 and 31 percent in 2013) could be an accurate measure of English children's performance because of orthographic complexity. Either that or the pass mark was arbitrarily set and the reason for its calibration politically motivated.

## 6. CONCLUSIONS

There are three conclusions. The first is that there are weaknesses in the advice for teachers and in the construction of the Check that affect its trustworthiness. We have suggested that there are problems categorising pseudo and real words, of phoneme-grapheme options that go unrecognised and we have questioned administrative guidance concerning the acceptability of children's pronunciation of pseudowords. We question how many Year 1 teachers would recognise that in Wordsworth's poetry the bard's Cumbrian origins are manifest in his rhyming of 'matter' with 'water', 'July' with 'truly' and 'remote' with 'thought' (see Harrison, 1978)? Similarly, how many Year 1 teachers are able read Jason's writing without his assistance:

'ThEckrocuDile is NoT *TuoDLEE* vishuss' (Newman, 1984)? If encoding invented spellings is the orthographic inversion of pseudoword decoding then, without realising that Jason is writing with an *American* English accent, it is difficult for the unknowing reader to grasp his intention - that 'The crocodile is not *totally* vicious'. In this regard we have suggested that the Check may be especially problematic for some pupils with ESL.

Secondly, even if the internal shortcomings of the Check were removed the inclusion of pseudowords would still be problematic. Above we noted Duff et al.'s recent conclusion that the Check is 'valid but unnecessary': 'When teachers are well educated about the cognitive mechanisms involved in reading... a mandatory phonics screening check is not necessary' (Duff, et al. 2014, p.12). However, if as they suggest the Check 'correlates strongly' with standardised measures of reading accuracy such as 'single-word reading' tests (ibid. p.6), they *presume*, rather than provide, a rationale for the inclusion of pseudowords alongside real words. There are reasons for resisting their inclusion. There is growing evidence that they encourage Key Stage 1 teachers to 'teach to the test' with over half now confessing that they rehearse 'familiarisation or practice sessions with pupils' (NFER, 2014, p. 8). Reading pseudowords also exacerbates the problem of short-term memory that has implications for what is claimed to be measured. One child presented in the DfE training video (2012) accompanies his lengthy attempt to read the pseudowords *sheb* - ultimately 'correctly' although we have noted unregistered alternatives here - with wild arm movements and dramatic eye rotations that may exemplify the outward signs of heightened brain activity discussed earlier. Landerl has argued that English children taught decoding from left to right 'leads to a very low reading speed, but is successful at least for short, one-syllable items. For the somewhat longer items, the children especially of the Grade 1 group sometimes found it difficult to keep all the sounds in working memory' (Landerl, 2000, p.252). For us the problems of speed and accuracy when short-term memory is congested, while trying to 'hold in the head' a string of unconnected letters read from left to right in readiness for blending, have implications for what is claimed to be tested. Moreover, the inherent meaninglessness of pseudowords raises philosophical questions about what a word actually *is*. Above we noted teachers' initial outcry at the confusion of proficient readers who looked for meaning in pseudowords (who today are presumably taught how not to err) and of the implication this may have for those who see themselves as fluent upon entry to school. But reading pseudowords and 'unknown real words' is philosophically quite distinct says Davis:

> Hepplewhite (2012) observes, defending the phonics Check: 'Reading unknown real words is the equivalent of reading non-words'. Now, we have to ask what is meant by 'unknown real words' here. If we are to suppose that the child has never seen the letter sequence before, and has never heard and understood any word in speech that might be represented by the said letter sequence, then perhaps she is right. However, surely, this is emphatically not reading! It is simply blending letter sounds to make a composite sound that might be used by speaker to utter words. If Hepplewhite meant by 'unknown real words' that the child has never seen the relevant letter sequence but does possess some kind of understanding or comprehension of words that the blended sound could be employed to represent, then tackling the reading of unknown real words is not like reading non-words... Yet in the check, she encounters the unknown real word in a context-free list. This means that she

cannot operate in terms of meaning on the text with which she is dealing. (Davis, 2013, p.27-8)

Thirdly, cross-language studies suggest that by the end of Key Stage 2 English children progress in reading to a standard equivalent to their European counterparts who learn with more transparent orthographies. By the latter stages of Key Stage 2 differences in the reading progress of, for example, Welsh and English children, learning respectively with simple and complex orthographies, 'had disappeared' (Wyse & Goswami, 2008, p.700; See also Goswami, et al. 1998, p.29). Hanley et al. similarly concluded:

One of the most important findings in this study is that the word decoding skills of most of the children learning to read English now appear to have caught up with those of the children learning Welsh. This is demonstrated by the absence of any difference in the nonword reading performance of the two groups of children and by the observation that the English children were able to read regular English words as accurately as the Welsh children were able to read the Welsh translations of these items. (Hanley et al. 2004, p.1407. See also Frith, et al., 1998, p.49; Seymour, et al. 2003, p.143)

While such testimony pre-dates the introduction of the Check, the evidence we have referred to above would indicate that real rather than pseudoword testing may be *at least* or possibly *more* accurate in predicting future reading fluency and serves to counter the claim that 'the best measure of phonological processing skill is the reading of pseudowords' (Siegel, 1998). Whether, therefore, 'real' word testing of Year 1 pupils to assess their reading skills is the way forward, is not within the scope of this paper. However, the effects of any testing regime upon the microclimate of the classroom, pupils' motivation and literacy learning more generally, remain a palpable concern:

We have yet to establish just what effect this policy has had on the literacy experiences of young children in state schools in England. We need among other things to talk with the young children themselves, those who are failing and those who were already well on the way to becoming successful readers, to examine their opinions of the experience of the check and the extent to which it is colouring their views on literacy. (Clark, Oct 2013b, p.15)


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